

by the net system, in which case the meshes on either surface of the ice-plate are of equal size.

As to the explanations which have been offered to account for the formation of the honeycomb structure, no theory seems to have been recently proposed which is not based upon that of Robert Emden, who supposed

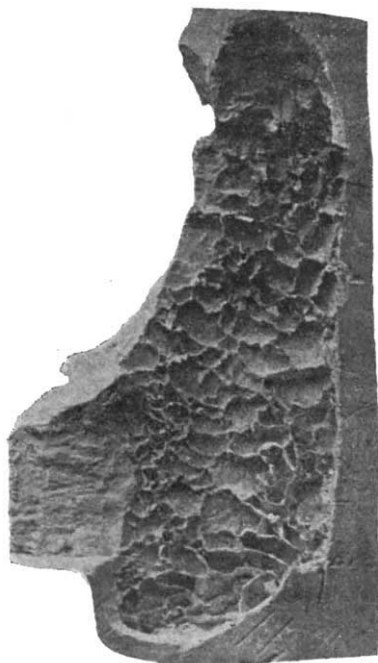


FIG. 1.—Structure of exposed surface of wall-ice.

that in all ice masses exposed for some time to a temperature neighbouring on the freezing point, the minute first-formed crystals, even when possessing an irregular original arrangement, tend to undergo a complete rearrangement, and to form crystal units of ever-increasing size, having similarly directed axes. The dimensions to which these new crystal units will attain is determined by the temperature variations. Should the temperature rise and a thaw set in, those portions of the ice where the individual crystals are in contact with one another will be the first to be attacked, and the melting process will produce the appearance of the net system.

Since the rock in which the caves or drifts are formed always possesses a somewhat higher temperature than the air within the cavity, the coalition of the individual ice crystals in contact with the cave wall will take place at a somewhat earlier period than that of the crystals on the exposed surface of the wall-ice, for the inner side will be sooner raised to a temperature closely approaching the freezing point. But in like manner, as the general temperature rises, the inner surface of the wall-ice will become exposed to the action of actual thawing earlier than the free outer surface, and the development of the growing crystal units—the groundwork for the “cells” of the honeycomb structure—will receive an earlier check on the inner surface than on the free surface. This explanation has been given to account for the fact that the meshes in contact with the rock are smaller than those exposed to the cave air, as shown in the accompanying illustrations reproduced from Dr. Lohmann’s paper, for which photographs were obtained from plaster casts of the ice surfaces.

But Emden’s theory, as briefly sketched above, does not seem to explain certain facts observed in connection with the “prismatic” structure shown by some forms of

ice. The peculiar form of the network developed, for instance, on the surface of an ice-stalactite, with its radially arranged tiers of “cells,” requires further explanation. Lohmann ascribes an important part in determining the arrangement of the “cells” to the expansion and contraction of the ice under changes of temperature. Since the coefficient of expansion of ice is great, the surface when exposed to variations of temperature will undergo a splitting process, which will result in the production of so-called “elementary cells.” These will then become crystal units (if not already such) by the process of coalition which Emden supposed to occur, and the ultimate dimensions of the prismatic structure are then



FIG. 2.—Structure of ice surface in contact with rock

finally determined by a rise of temperature, forming spaces between the “cells” as above indicated. But while this improved theory seems to offer a fuller explanation of the observed facts, final proof of its value as a sound hypothesis is only to be sought in the evidence of further experimental investigation.

F. L. K.

NOTES.

PROF. A. A. MICHELSON, professor of physics in the University of Chicago, has been elected a correspondant of the Paris Academy of Sciences.

THE first meeting of the International Conference for the Protection of Wild Animals in Africa will be held at the Foreign Office on April 24. The British representatives will be the Earl of Hopetoun, G.C.M.G., Sir Clement Hill, K.C.M.G., C.B., head of the African department of the Foreign Office, and Prof. Ray Lankester, F.R.S., director of the Natural History Museum.

To encourage the study of aerial navigation, a member of the Aéro Club of Paris has given the sum of 100,000 francs, to be awarded as a prize to the inventor of an efficient aerial machine. The test to be applied is that the machine shall travel from the grounds of the Club, or from the hills of Longchamps, to the Eiffel Tower, and then to return to the starting point. The length of the whole journey is about eleven kilometres, and it has to be accomplished in half an hour or less. The competition is international, and the offer will remain open for five years from the middle of the present month. The interest upon the sum placed at the disposal of the Club will be awarded annually for

works or inventions bearing upon the problem of aerial navigation. Further particulars can be obtained from the secretary of the Club, M. Emmanuel Aimé, 48 rue du Colisée, Paris.

It is proposed, in recognition of the great services rendered by the late Dr. D. G. Brinton to anthropological science by his teachings, numerous publications, and untiring zeal, to establish in his memory a Brinton chair of American Archaeology and Ethnology in the University of Pennsylvania. At a memorial meeting held in January, the plan was favourably mentioned and grateful recognition was accorded to Dr. Brinton's unselfish devotion to his chosen life-work. The place selected for the chair seems especially appropriate, since the University of Pennsylvania now possesses Dr. Brinton's valuable library, his own gift shortly before his death. The association of Brinton's name with the University from 1886, when the chair of American Archaeology and Linguistics was created for his occupancy, may in this way be made permanent. In order to accomplish the proposed plan, it will be necessary to secure an endowment of 50,000 dollars from individual sources. Patrons of science and others interested in the scheme should communicate with the Brinton Memorial Committee, 44 Mount Vernon-street, Boston, Mass., where further information is to be obtained if desired. Messrs. Drexel and Co., Bankers, Philadelphia, have consented to act as treasurers of the fund being raised.

WE regret to see the announcement of the death of Sir William Priestley, the distinguished physician, at seventy-one years of age. His father was a nephew of the discoverer of oxygen. Sir William Priestley received his medical education in London, Paris, and Edinburgh, and graduated as M.D. at the University of Edinburgh in 1853. He was a Fellow of the Royal Colleges of Physicians of London and Edinburgh, and of the Linnean Society, and also a member of several other learned associations. He published several works on natural history and medical science.

At a meeting of the Liverpool Geological Society, held on April 10, reference was made to the death of Mr. G. H. Morton, whose services to geology were briefly described last week (p. 571). The following resolution was passed:—"That the members of the Liverpool Geological Society desire to record their deep sense of the loss which they and geologists generally have sustained in the death of Mr. George Highfield Morton. Mr. Morton was founder of the Society, serving it for many years both as president and honorary secretary, and up to the time of his decease he was a constant and highly-valued contributor to its *Proceedings*, enriching them with the results of his untiring energy and devotion to geological science. Whilst deeply regretting the irreparable loss, the members wish to express their keen appreciation of the value and extent of Mr. Morton's scientific work, especially of that portion of his work relating to Liverpool and its vicinity."

THE Paris correspondent of the *Chemist and Druggist* gives the following particulars about the late Dr. Henri Beauregard, professor of cryptogamy at the Paris School of Pharmacy. Dr. Beauregard was appointed assistant professor at the School in 1879, and held the post until 1894. He was soon afterwards nominated as the titular professor of cryptogamy, and was also assistant for comparative anatomy at the Paris Museum. During this time he published several important works treating of insects, some of which have been recognised as standard works by the Academy of Sciences. At the School of Pharmacy he specialised in the study of micrography and cryptogamy, and published his "Guide to Practical Work in Micrography." In 1892 he was called upon to take the professorship of cryptogamy for twelve months, and thenceforward devoted himself entirely to that science.

Dr. Beauregard's premature death is a distinct loss to French pharmacy and to the Paris School, where his scientific attainments and personal qualities were much valued and appreciated.

THE Athens correspondent of the *Times* announces that the excavations carried out by Mr. Arthur Evans and Mr. D. G. Hogarth in Crete continue to yield results of the highest interest. On that portion of the site of ancient Knossos which Mr. Evans has selected for investigation (Kephala) a Mycenaean palace has been discovered containing relics of extraordinary importance, by means of which the hitherto uncertain question of Mycenaean writing has been finally settled. In the chambers of the buildings have been found a whole series of clay tablets, analogous to the Babylonian, but with indigenous Cretan script.

DR. BERTHOLD LANFER, of the American Museum of Natural History, has just returned from two years of exploration in Northern Asia, as the representative of the Jesup North Pacific Expedition.

MESSRS. W. GOODFELLOW AND C. HAMILTON have lately returned from a successful expedition in the Colombian and Ecuadorian Andes, during which they made a collection of upwards of 5000 bird-skins, comprising examples of many rare species. The travellers landed at Buenaventura, on the Pacific Coast, in April 1898, and thence crossed the Andes into the valley of the River Cauca. This was ascended, and, passing through Popayan, Messrs. Goodfellow and Hamilton entered the Republic of Ecuador, at Tulcan, proceeding thence to Quito, where a lengthened stay was made. From Quito excursions were effected to Pichincha, and to the low country on the Pacific Coast near Santo Domingo. Leaving Quito on March 1 last year, Messrs. Goodfellow and Hamilton crossed the Andes to the upper waters of the Napo, and descended that river in canoes to Yquitos, in Peru, whence the journey home was effected by steamer. Mr. Goodfellow is preparing an account of the birds collected during this remarkable journey for the *Ibis*.

THE Council of the Zoological Society of London has given instructions for the publication of an Index-Volume to the new generic names mentioned in the volumes of the *Zoological Record* since 1879. This Index-Volume, in order to increase its usefulness, will include names accidentally omitted from Scudder's "Nomenclator" and from the volumes of the *Zoological Record*. Thus zoologists will have at their disposal (in the "Nomenclator Zoologicus," and the new "Index" together) a complete list of all the names of genera and subgenera used in zoology up to the end of 1900. It is earnestly requested that any one who knows of names omitted from Scudder's "Nomenclator" or from the volumes of the *Zoological Record*, will forward a note of them, together, if possible, with a reference as to where they have been noticed or proposed, so that the new list may be made as complete as possible. Such information should be addressed to the Editor of the *Zoological Record*, 3, Hanover Square, London, W.C., or to Mr. C. O. Waterhouse, British Museum (Natural History), South Kensington, London, who is engaged in compiling the list.

PROF. GUIDO CORA, of Rome, is engaged in the preparation of a work on his journey in Montenegro last summer, in which he explored particularly the eastern part of the land and some of the adjoining districts. He also examined the ruins of the Roman town of Doclea, where he found some new inscriptions.

MRS. LANKESTER, who died on April 9, was the widow of Dr. Edwin Lankester, and was well known as a popular writer on science. Among her books are "Wild Flowers Worth Notice," the literary portion of that large series of volumes "Sowerby's British Botany" (now in course of republication), and "Talks about Health."

THE first of four zoological lectures arranged by the Zoological Society will be delivered to day by Mr. A. Smith Woodward, who takes for his subject "The Animals of Australia." The remaining lectures are:—"The Freshwater Fishes of Africa," by Mr. G. A. Boulenger, F.R.S.; "The Gigantic Sloths of Patagonia," by Prof. E. Ray Lankester, F.R.S.; and "Whales," by Mr. F. E. Beddard, F.R.S.

ON Tuesday next, April 24, Dr. H. R. Mill will deliver the first of a course of three lectures at the Royal Institution on "Studies in British Geography." On Thursday, April 26, Prof. Dewar will commence a course of four lectures on "A Century of Chemistry in the Royal Institution." On Saturday, April 28, Prof. Stanley Lane-Poole will deliver the first of a course of two lectures on "Egypt in the Middle Ages." The Friday Evening Discourse on April 27 will be delivered by Lord Kelvin, on the subject of "Nineteenth Century Clouds over the Dynamical Theory of Heat and Light." The discourse on May 4 is to be on "Pottery and Plumbism," and the lecturer will be Prof. T. E. Thorpe, F.R.S.

THE annual general meeting of the Society of Chemical Industry will be held in London in July next. As the president, Prof. C. F. Chandler, and with him a considerable number of the members of the New York section of the society, will attend, it is hoped that the members of the London section will exhibit their appreciation of the hospitality extended in 1895-6 to the then president and the hon. foreign secretary of the society when visiting the United States. London members of the society have been invited to contribute to an expense guarantee fund.

THE Jacksonian prize of the Royal College of Surgeons of England for the year 1899 has been awarded to Dr. Harry Lambert Lack, for a dissertation on the pathology, diagnosis and treatment of inflammatory affections of the nasal fossæ and associated sinuses and air cells. The subject for the prize for the ensuing year 1901 is "The Diagnosis and Treatment of Bullet Wounds of the Chest and Abdomen." The John Tomes prize, founded by the dental profession in honour of the late Sir John Tomes, F.R.S., has been awarded to Mr. John Howard Mumfory, for his original and other scientific work on the subjects of dental anatomy, histology and pathology.

THE fifth annual congress of the South-Eastern Union of Scientific Societies will be opened at Brighton on Thursday, June 7, when the Mayor of Brighton (Alderman Stafford, J.P.) will receive the members of the congress, and the president-elect, Prof. G. B. Howes, F.R.S., will deliver the annual address. On the following day, papers will be read on the skin of liquids, by Dr. C. H. Draper; the structure of the Lower Greensand near Folkestone, by Dr. H. C. Sorby, F.R.S.; dust, by Dr. H. Gabbett; science at the end of the eighteenth century, by Mr. Arthur W. Brackett; and the colouring of pupæ in relation to their surroundings, by Mr. F. Merrifield. A reception by the Mayor of Hove will be held on Friday evening, June 8, and Mr. Fred Enoch will lecture on "Wonders and Romance of Insect Life." On Saturday, June 9, Mr. F. Chapman will describe the Brighton Raised Beaches and their microscopical contents. In connection with the congress, a photographic exhibition is being organised in order to illustrate the various applications of photography to scientific work. The exhibition will not be limited to work done by members of the affiliated societies, and the committee will welcome any offers of loans that would be likely to prove interesting and suggestive. Intending exhibitors should communicate with Mr. H. E. Turner, Lindfield Lodge, Folkestone, not later than May 7.

AN article in the current number of the *Fortnightly Review*, by Mr. Rollo Appleyard, states the case for engineers of the

Royal Navy, and draws attention to their inadequacy, owing to defects on the Admiralty Board, to meet the demands which the conditions of naval war entail. It also gives an outline of the scheme of studies and examinations at Keyham College and at the Royal Naval College, Greenwich, through which the Engineer R.N. has to pass, and an account of his complex duties afloat. Notwithstanding these defects, it appears that engineers have not a single representative on the Admiralty Board. The question is scarcely one which can be discussed in our columns. On the other hand, it is too technical for the daily Press. It could best be dealt with by a great civil body of experts, such as the Institution of Civil Engineers, and it is sincerely to be hoped that they will give it consideration at an early date.

DURING a heavy thunderstorm at Herbertsdale, Cape Colony, on February 25, a remarkable fall of hail occurred. Mr. O. D. Deacon sends us a description of the storm received from his brother, who witnessed it. From this we learn that the hailstones ranged in size from marbles to small hen's eggs, and very many were of the size of turkey's eggs. Some of these had a very peculiar shape, being round and surrounded with spikes so as to present an appearance not unlike a hedgehog when rolled up in a ball, or like a bristly sea anemone. The hailstones were the largest Mr. Deacon had seen during a thirty-seven years' residence in South Africa, and their spiky character is of peculiar interest.

WE have received from the Danish Meteorological Institute its *Nautical Meteorological Annual* for 1899, prepared under the superintendence of Captain V. Garde, R.D.N. With the exception of a slight change in the title, and the use of English instead of French alongside the Danish explanatory text, the form is the same as in the two previous years. The contents form a most valuable contribution to the meteorology of the northern parts of the North Atlantic, consisting (1) of the state of the ice on the east and west of Greenland, with charts, (2) of wind and sea-surface temperature charts, and (3) of meteorological observations taken every four hours at light and coast stations. We have already referred to the ice charts (*NATURE*, March 1, p. 422) from an advance sheet. The wind charts comprise the area between Scotland, Iceland, and the west coast of Greenland, and very clearly represent, by means of roses, the relative percentage of frequency of the eight principal directions, and the average force in each of the months April to October, from ships' observations, from 1876 to 1895; each chart is accompanied by a short discussion of the chief results, and a statement of the average number of stormy days experienced in various districts. The charts of the sea-surface temperature show the mean values for each one-degree square, for the first and last halves of the month.

A GOOD general view of the position of the mineral industries of the world can be obtained from Prof. Le Neve Foster's latest report (Mines and Quarries: General Report and Statistics. Part IV.—Colonial and Foreign Statistics.) From this rich source of information we learn that about 1,800,000 persons are employed in mining and quarrying in the British Empire, of whom nearly one-half are working in the United Kingdom. Foreign countries employ altogether at least two and a half million persons. Although the proportion of silver furnished by the British Empire is only one-ninth of the general total, it is pleasing to note that New South Wales, with its wonderful mines at Broken Hill, is now approaching Bolivia and the German Empire in productiveness. The British Empire produces seven-elevenths of the total tin supply of the world; in fact, the Federated Malay States alone yield more than one-half.

As regards safety, the collieries of the United Kingdom occupy a high place compared with those of the rest of the world. Prof. Foster sounds a note of warning to British mine-owners and points out that the parasitic disease known as ankylostomiasis is attracting the special attention of several foreign Governments, owing to the ravages which it is committing among colliers. From inquiries he has made among his colleagues, it appears that the disease is not known among British colliers; but as it has made itself a home in coal mines in Northern Europe, it might be introduced into this country by foreign workmen.

Two interesting papers on changes in iron and steel rails were read at the meeting of the Institution of Civil Engineers on April 10. In the first of these, on "The development of the manufacture and use of rails in Great Britain," Sir Isaac Lowthian Bell, Bart., F.R.S., traced the history of the development of wrought-iron and steel manufacture, with particular reference to its employment for rolling into rails. The results of an experimental investigation of the deflection of rails at various speeds of the train, indicate that the deflection, and therefore the pressure on the rail, diminishes as the speed increases. The durability of rails manufactured by the basic process has proved equal to that of steel rails manufactured from hematite ore. In the second paper, on "The wear of steel rails in tunnels," by Mr. Thomas Andrews, F.R.S., the effects of the deteriorating influences peculiar to rails laid in tunnels were described. Among these are the increased corrosion of the surface of the rail, due to the action of moist vapours, and the increased chemical action of the ballast on the foot of the rail; the ballast, on account of its porous nature, absorbs the vapours and hence acts with increased deteriorative force on the rails. Mr. Andrews has made a careful examination of a rail which did its life's work in such a situation. The rail was laid in a tunnel for seven years, on a straight piece of road having a falling gradient of 1 in 90, and it carried the main-line traffic during this time without fracture. The tunnel was about 1000 yards in length, and it was situated fairly near the sea-coast. It lay in a direction nearly north and south. This fact was pointed out, as Mr. Andrews has observed indications that magnetisation exerts an influence tending to increase the corrosibility of steel in certain solutions. The rail, which originally weighed 54 lbs. per yard, had lost weight at the rate of 2.8 lbs. per yard per annum, and on the face the rail had worn down to the extent of $\frac{3}{8}$ -inch. The chemical analysis showed that sulphur was present in considerable excess, but otherwise the general composition of the steel was excellent. The physical tests showed a very good result, the strength of the metal being normal, and an elongation of 27 per cent. being obtained. From the results of the investigations, the conclusion was arrived at that, as a general rule, rails in tunnels should only be allowed to remain in the permanent way for one-half (or in some cases only one-third) of the time that is usually allowed for the ordinary use outside tunnels.

In the *American Geologist* for last February, Prof. E. W. Claypole gives a brief description of an earthquake felt in southern California at 4.25 a.m. on December 25, 1899. The disturbed area is thinly populated, but the shock was felt for at least 150 miles from the coast. In the two villages of San Jacinto and Hemet, which stand in an elevated valley filled with detritus from the adjoining mountains, every brick building was seriously damaged by the shock. Prof. Claypole remarks that, from the continued occurrence of light tremors, the region would be a good one for making seismological observations.

An important memoir, by Mr. R. D. Oldham, on the propagation of earthquake motion to great distances, has just been published in the *Phil. Trans.* of the Royal Society. The com-

plete record of a distant earthquake, he remarks, shows three principal phases, differing in character and amount of displacement. During the first two phases, the motion is principally of a to-and-fro nature; while in the third phase, the movement is composed of long surface undulations resembling the swell of the ocean. In the first two phases, the surface-velocity increases with the distance from the origin, and in accordance with the hypothesis that they consist of elastic waves propagated through the earth at rates which increase with the depth below the surface. If the time-curves for the beginnings of the first and second phases are continued to the origin, they give initial rates of propagation which agree fairly closely with the probable initial rates of propagation of condensational and distortional waves in continuous rock; and Mr. Oldham therefore concludes that the first phase represents the arrival of condensational waves, and the second phase of the distortional waves, both having travelled along brachistochronic paths through the earth. In the third phase, the surface-velocity appears to be constant at all distances from the origin, from which we may infer that they are propagated as surface undulations. The velocity is not, however, the same for all earthquakes, but increases with the intensity; and from this fact, and the high velocity in the case of great earthquakes, it seems probable that the propagation of these waves is, at least in part, gravitational.

In the *Transactions* of the Institution of Engineers in Scotland, Prof. Andrew Jamieson gives an account of his visit to Cape Town last year, undertaken for the purpose of investigating the action of electric tramway currents in disturbing the action of the submarine cables landed at the Cape. Prof. Jamieson summarises the various probable actions of the tramway currents on the cables as arising from (1) electrolysis; (2) affecting the potential of the earth connection to the receiving instrument; (3) direct electro-magnetic induction; (4) disturbances due to leakage or stray return currents from the tramway rails. It would appear probable from the discussion that the influence of earth-resistance is very considerable at the Cape. Prof. Jamieson reported that nothing short of a symmetrically arranged and specially made twin *twisted* core with double armouring would do for the shore end, and that it would not require to be more than from two to three nauts. It has since been stated that the recently laid shore end of the new cable from Cape Town to St. Helena has been made and connected in this way.

MR. SAMUEL CUTLER, JUN., who has given especial attention to the development of the carburetted water-gas industry, describes the process of production, and various modern types of plants, in *Feilden's Magazine* for April. Carburetted water-gas, as its name implies, is water-gas carburetted, or enriched, with extraneous hydro-carbons, usually derived from petroleum distillates. The gas is now manufactured at more than sixty important gasworks in the United Kingdom, and the number of installations is rapidly increasing. As produced at the present time, the gas is as luminous and odorous as coal-gas, and in the United States it is supplied and used in its undiluted state, though it contains a much larger proportion of carbon dioxide than exists in coal-gas. Here, however, it is chiefly employed to enrich coal-gas. A Department Committee, appointed in 1898, reported in favour of a somewhat stringent limitation of the percentage to be supplied for illuminating purposes, but no legislative measure has yet been based upon the recommendations.

THE present commercial conditions in the vast Chinese Empire, and the possibilities of future development, are described in detail, and from many points of view, in the Monthly Summary of Commerce and Finance of the United States (December 1899), prepared by the Bureau of Statistics. During the short time in which foreigners have been admitted to the commerce of China,

important developments have taken place. The 400,000,000 people have hitherto been served by 350 miles of railway, or less than one mile for each million persons. More than ten times this length of railway is, however, now projected, and not only projected in the ordinary sense of the term, but in many cases being actively pushed forward and with prospect of a comparatively early completion. With telegraphs connecting the capital with every province and also with the outside world; with steam navigation and foreign steam vessels penetrating to the very head of the many navigable waterways; with new treaty ports opening upon the coast and far inland; and with foreigners permitted to travel for business or pleasure to the remotest corners of the Empire and carry with them their merchandise and machinery, the changes which the commercial conditions of China are undergoing are well worthy of attention. The present report is full of valuable information to business men and students of political and commercial geography.

AN interesting and suggestive article, by Monsieur E. de Cyon, on the means whereby the "homing" pigeon ascertains the direction in which it should fly—in other words, its orientation—appears in the *Revue Scientifique* of March 24. After referring to the intimate connection between the migratory and the "homing" instinct, the author points out an important difference in the conditions under which migration and "homing" are carried out. In the former case the bird may have experience to guide it; and it is at least well acquainted with the neighbourhood in which it lives. On the other hand, a "homing" pigeon, after being carried a longer or shorter distance by train in a dark compartment, is suddenly let loose in some place it has never seen before, yet, after mounting in circles to a considerable elevation in the air, it suddenly starts in the direction of home, not unfrequently following the course of the railway by which it travelled. As the result of experiments, the author is of opinion that the retina and the nose take an important share in the orientation; the other conditions being a keen "local memory," and a high development of the cerebral organs connected with the nerves upon which this sense of orientation depends.

THIRTY-NINE new species of Weevils are recorded and diagnosed from Madagascar by J. Faust, and eighteen new and imperfectly-known species of beetles belonging to the genus *Lomaptera* and its allies from the Papuan region, are described by K. M. Heller in the *Abhandl. u. Berichte K. Zoolog. Anthr. Mus. Dresden*, 1899, Bd. viii. (*Festschrift für A. B. Meyer*). In the same volume, B. Wandolleck has an important memoir on the anatomy of the cyclorhous larvæ of Diptera, the form more particularly studied being the larva of *Platycephala planifrons*. It is illustrated by two plates of photographs of transverse sections through the larva, and by several cuts in the text. The volume closes with a paper, by J. Jablonowski, on the development of the medullary cord in the pike, illustrated by one plate. There is very little difference between the stages here described and those which other observers have recorded in various species of the Salmonidæ.

THE twenty-second annual meeting of the German Ornithological Society was held in Dresden in May 1897, and the papers read before that body have been published in the *Abhandl. u. Berichte K. Zoolog. Anthropol. Mus. Dresden*, Bd. vii. 1899. Besides other papers in the same volume there is one on new beetles from Celebes and from the Philippines, by K. M. Heller, and a memoir on the mammals of Celebes and the Philippine Archipelago, collected by the Sarasins and described by A. B. Meyer. This is a valuable piece of work from a faunistic point of view, several new forms are recorded and figured. An appendix on the spoon- or spatula-shaped hairs occurring in certain bats is added by J. Jablonowski.

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A REPORT on the working of the Botanical Department (Jamaica) for the year ending March 31, 1899, appears in a supplement to the *Jamaica Gazette* for February 1, 1900.

"STUDIES of North American Grasses: The North American species of *Chaetochloa*," by Messrs. F. Lawson-Scribner and Elmer D. Merrill, is the subject of *Bulletin* No. 21 of the U.S. Department of Agriculture (Division of Agronomy).

OF equal value, from a systematic point of view, are the contributions from the Gray Herbarium of Harvard University, contributed to the *Proceedings* of the American Academy of Arts and Sciences. No. xvii. of the new series comprises new species and varieties of Mexican plants, by J. M. Greenman; synopses of the genera *Jaegeria* and *Russelia*, by Mr. B. L. Robinson; new *Dioscoreas* from Mexico, by Mr. E. B. Uline; new Phanerogams from Mexico and Central America, by Mr. B. L. Robinson.

THE firm of Gustav Schmidt, Berlin, is publishing, in twelve parts, a collection of forty-eight excellently-coloured plates of garden flowers and plants, under the title "*Die schönsten Stauden für die Schnittblumen und Gartenkultur*." The series of pictures, and the accompanying descriptive text, are edited by Messrs. Max Hesdörffer, E. Köhler and R. Rudel.

MESSRS. J. AND A. CHURCHILL have just published the third edition of an "Elementary Practical Chemistry and Qualitative Analysis," by Dr. Frank Clowes and Prof. J. B. Coleman. The book contains a good course of laboratory work, commencing with simple measurements and manipulations, which lead in an instructive way to analytical reactions of the commonly occurring metals and inorganic acid-radicles, and the means of detecting them.

WITH the copper apparatus for the preparation of fluorine, recently described, M. Moissan has been able to take up the examination of fluorides which could only be obtained hitherto in quantities too small for detailed study. It was shown some years ago that sulphur took fire in fluorine, and in the number of the *Comptes rendus* for April 2, M. Moissan gives a description of the properties and methods of isolation of one of the sulphur fluorides thus formed. Fluorine is passed over sulphur contained in a copper boat in an atmosphere of nitrogen, and the resulting gases cooled to -80° C. in a mixture of solid carbon dioxide and acetone. By allowing the liquid thus obtained to boil off at the ordinary temperature, a mixture of fluorides of sulphur is obtained, partly absorbable by potash. The unabsorbed portion proved to be the hexafluoride, SF_6 , which possessed remarkable properties for a fluoride, being a colourless, odourless gas, so inert in its behaviour towards reagents as to be comparable to nitrogen. It is unacted upon by prolonged contact with potash, by fused potash or lead chromate, and has no effect upon red-hot copper oxide; phosphorus and arsenic can be distilled unaltered in the gas, and sodium can be melted in it without change, the temperature having to be raised above the boiling point of the metal before reaction sets in. Further details of this interesting gas are promised.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*, ♂) from India, presented by Mr. T. Packer; a Barbary Mouse (*Mus barbarus*) from Barbary, presented by Master Chapman; a Lyre Bird (*Menura superba*, ♀) from South-East Australia, presented by Messrs. Carrick and Fry; a Roller (*Coracias garrulus*), European, deposited; two Australian Thicknees (*Edicnennes grallarius*); two Masked Wood Swallows (*Artamus personata*); two — Wood Swallows (*Artamus*, sp. inc.) from Australia, purchased; seven Barbary Wild Sheep (*Ovis tragelaphus*, 3 ♂, 4 ♀), born in the Gardens.